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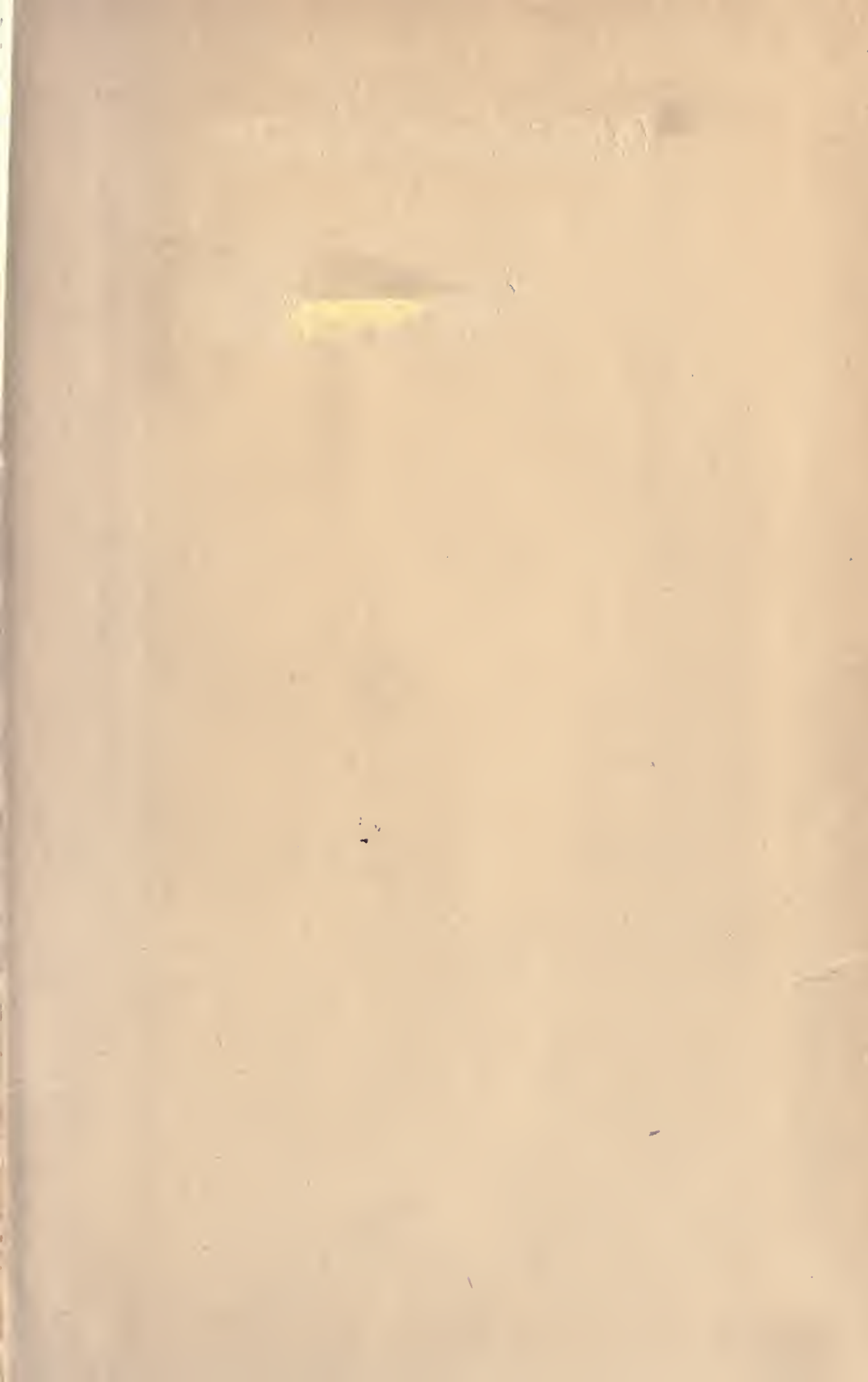
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PRELIMINARY DESCRIPTION OF A NEW
MARSUPIAL SABERTOOTH FROM THE
PLIOCENE OF ARGENTINA

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The Marshall Field Paleontological Expeditions collected from the Araucanian formation of Argentina in 1926 certain specimens of marsupial carnivores which may be classified with the Borhyaenidae, but which have many characteristics to distinguish them from the known members of that family. The specimens belong to three individuals and include two well-preserved skulls, one entire mandible and various leg and foot bones. These parts are sufficient to show the more important characteristics of the skeleton. The discovery was reported to the Paleontological Society of America in 1928 (Bull. Geol. Soc. Amer., 40, p. 117, 1929) but no names were then given. A full description has been prepared in a paper designed to be published in the Field Museum Memoirs Series. This preliminary description is intended to bring out the more important characters of the animals and to fix the genus and its relationships to other marsupials.

Thylacosmilus gen. nov.

Generic characters.—Large carnivorous marsupials having massive facial region and short sagittal crest; upper canine teeth strongly developed, deeply rooted and hypsodont; a deep mandibular symphysis and a flange on the mandible to receive the upper canine; superior branch of the maxillaries extending backward between the orbits and meeting at the median line; nasal bones long, attenuate and laterally compressed; orbits entirely enclosed in a bony ring; occipital condyles strongly projecting; a prominent pair of tubercles developed on the basisphenoid; postpalatine vacuities and entepicondylar foramen absent; dentition, I $\frac{0}{0}$, C $\frac{1}{1}$, P $\frac{2}{2}$, M $\frac{4}{4}$; digits V-IV; fore feet digitigrade, hind feet plantigrade. Genotype, *T. atrox*.

No. 325

T. atrox sp. nov.

Horizon and locality.—Araucanian (Pliocene), Corral Quemada, Catamarca, Argentina.

Holotype.—No. P14531 Field Museum, skull and parts of skeleton.

Paratype.—No. P14344 Field Museum, cranium, mandible, various vertebrae, femur, tibia, fibula, and tarsal bones.

Specific characters.—Skull, length in holotype 260 mm., P^2 having a single root, P^3 a double root. The frontals do not enter into the formation of the sagittal crest.

T. lentis sp. nov.

Horizon and locality.—Same as that of *T. atrox*.

Holotype.—No. P14474 Field Museum, incomplete skull with dentition.

Specific characters.—Skull in holotype, length 197 mm., P^2 having single root grooved on lateral and mesial surfaces, P^3 having two lateral roots and a vestige of the mesial root. The frontals enter into formation of the sagittal crest.

The skull of Thylacosmilus is deep in its vertical dimension and massive in structure. The facial region is convex, the canine teeth long and trenchant, the arches short, massive, and little extended laterally beyond the orbits. The occipital region is massive, the muscular attachments are strongly developed. The orbit is small and appears low on the side of the face. The sagittal crest is short and high, the lambdoidal crest massive. The mastoid process is similar to that of the machairodonts, the auditory meatus opens downward.

The facial region is made up largely of the maxillary bones. The superior branches of these bones consist of a pair of lobe-like processes which enclose the roots of the great canine teeth and, in their posterior halves, overlie the nasal bones. The nasals are long and narrow, the premaxillaries short and edentulous. In front of the orbit is a wide fossa or antorbital pit. The lachrymal bone is perforated within the orbit, is narrow at the antorbital margin but is produced backward above it. The frontals are much modified from the usual borhyaenid type by the backward intrusion of the maxillary processes. They meet at the surface in a short suture (10 to 20 mm. in length in different individuals) above the anterior wall of the brain case.

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The palate is broad and firmly ossified. It is perforated in the premaxillary region by a small pair of anterior vacuities and posteriorly by a pair of foramina similar to those in *Borhyaena*. The posterior nares are of the common borhyaenid type and offer no evidence of aquatic habits. The basilar foramina show some departure from the usual arrangement in the borhyaenids.

The mandible is characterized by a narrow anterior aspect, a deep symphysis and a wide flange for the reception of the upper

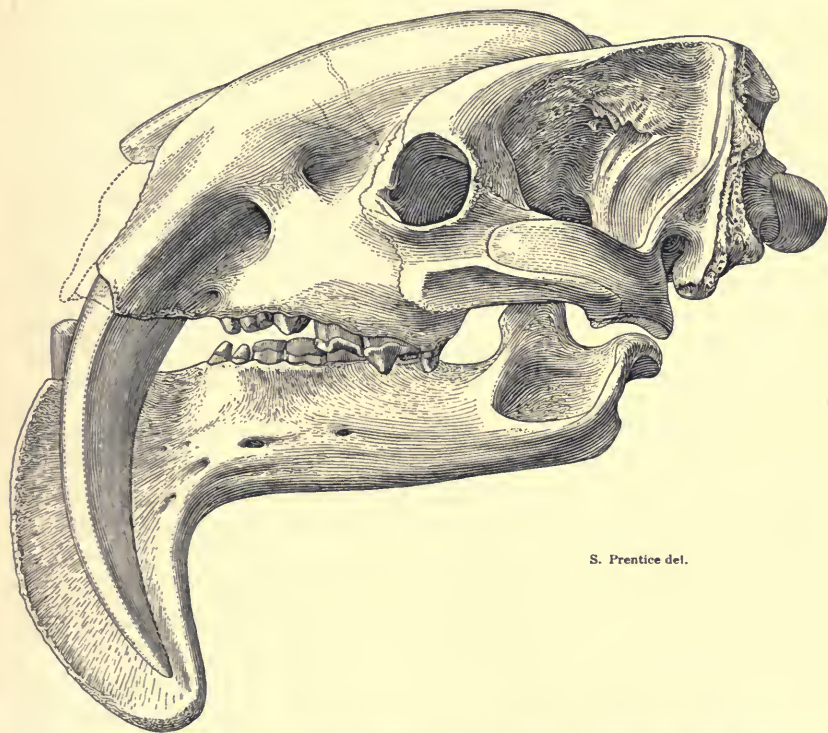


FIG. 6. Side view of skull of *Thylacosmilus atrox*. Holotype No. P14531 Field Museum

canine tooth. This development is similar to the structure of the mandible in such Oligocene machairodonts as *Hoplophoneus* and *Eusmilus* but is carried to a much greater extreme. The ramus of the mandible is straight and narrow; the condyle, coronoid process, and mastoid fossa are similar to those of the machairodont felids but less strongly developed. The angle is short and slightly inflected.

The dentition is of the general borhyaenid type but not so strong in the molar-premolar series as that of *Borhyaena*. The incisors

are eliminated entirely both above and below. The great upper canine is long, trenchant, and sub-triangular in cross section. A thin layer of enamel covers the lateral surface. A short diastema marks the place of the missing upper first premolar. The second premolar is simple, the third is two-rooted. The crowns of the molars are much worn in both specimens. The third upper molar is of an advanced sectorial type. The protocone and paracone are barely traceable. The fourth molar is reduced to a strong tubercle with its long axis directed transversely.

The lower canine tooth is known from one specimen only. It consists of a cylindrical root from which the enamel of the crown has been entirely worn away by attrition. This tooth is succeeded in the dental row by a wide diastema, varying from 25 to 35 mm. in the two species. The second and third lower premolars are simple, conical teeth and in the best-preserved specimen are little worn. The lower molar series, like the corresponding upper teeth, is deeply worn at the crown. The fourth molar is a well-developed sectorial tooth with a reduced talonid. The entire molar-premolar dentition bears evidence of attrition at the crown which indicates, in a flesh-eater so well equipped with weapons for the kill, a degenerate food habit.

The development of the great canine tooth with the accompanying flange on the mandible, the low condyle and low coronoid process, and the restricted masseteric fossa constitute a striking parallel development with the earlier machairodont sabertooths of the northern hemisphere. Apparently this peculiar adaptation is the result of certain mechanical habits independently acquired by the two widely separated lines of animals. This specialization was perhaps hampered in *Thylacosmilus* by the less vigorous type of molar tooth which, lacking a strong covering of enamel, did not have the strength necessary for the development of a highly effective pair of sectorials. For this reason, the shearing teeth, so important in the feeding habits of the felines, failed to attain a high degree of efficiency in the marsupial sabertooth.

The position of *Thylacosmilus* among marsupials is apparently that of a highly modified member of the indigenous South American Borhyaenidae. These animals are so widely separated from the more conservative members of that family as to have lost many of their cranial characteristics. The vertebrae are modified from those of the typical borhyaenids chiefly in the direction of greater strength in the cervical series. The leg bones and the feet show no important

differences from those of the Santa Cruz (Miocene) genus *Borhyaena*. This animal, therefore, apparently belongs to an aberrant phylum of the South American family which early branched off from the more conservative stem. Its size and strength at once place it at the head of the known Pliocene marsupials as the dominating member of its time. Not only is *Thylacosmilus* the most highly specialized of the known family of borhyaenids but the peculiar modifications centering about the development and the use of the great canine tooth mark it as one of the most unique flesh-eating mammals of all times.

RELATIONSHIPS OF *THYLACOSMILUS* TO OTHER BORHYAENID MARSUPIALS

(Adapted from classifications by Sinclair and Simpson)

Superfamily BORHYAENOIDEA Simpson, 1932

Family BORHYAENIDAE, Eocene-Pliocene, Ameghino, 1894

Subfamily BORHYAENINAE

Borhyaena Ameghino, Oligocene, Miocene.

Prothylacynus Ameghino, Miocene.

Cladosictis Ameghino, Miocene.

Various other genera less perfectly known.

Subfamily THYLACOSMILINAE

Thylacosmilus Riggs, Pliocene

T. atrox

T. lentis

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